

Astro 25 “Field Astronomy in the California Mountains”

A group of people are gathered around a campfire at night in a mountain wilderness. The fire is bright and glowing, illuminating the scene. The people are wearing warm clothing, including jackets and hats. The background is dark, suggesting a night sky. The overall atmosphere is cozy and focused on the activity of field astronomy.

July 13-15, 2018

At Chimney Peak Wilderness

Come join us for a weekend in the Sierra: Astro 25 - Field Astronomy in the Calif. Mtns - July 13-15, 2018

1 unit summer course - camping under the stars! \$20 + usual reg fees

* Breakfasts, dinners, including Dr. Rick's French Crepes breakfast.

* Study an ancient archeo-astronomy village site and pictographs,

* Visit Remington Hot Springs on the Kern River,

* Big Science! We'll video-record the asteroid Christa occulting a star,

* Summer Milky Way Galaxy telescope explorations

* Dr. Rick's "micro-lectures" on all things astronomy.

Google "Cabrillo College Astro 25" for details.



Milky Way above the sage



Campfire cosmology lecture! Especially if cloudy one or both nights (not likely!)



Astro 28M, in 2010, was conducted here



**This sign is at the Hwy 178 /
Canebrake Rd turnoff.**

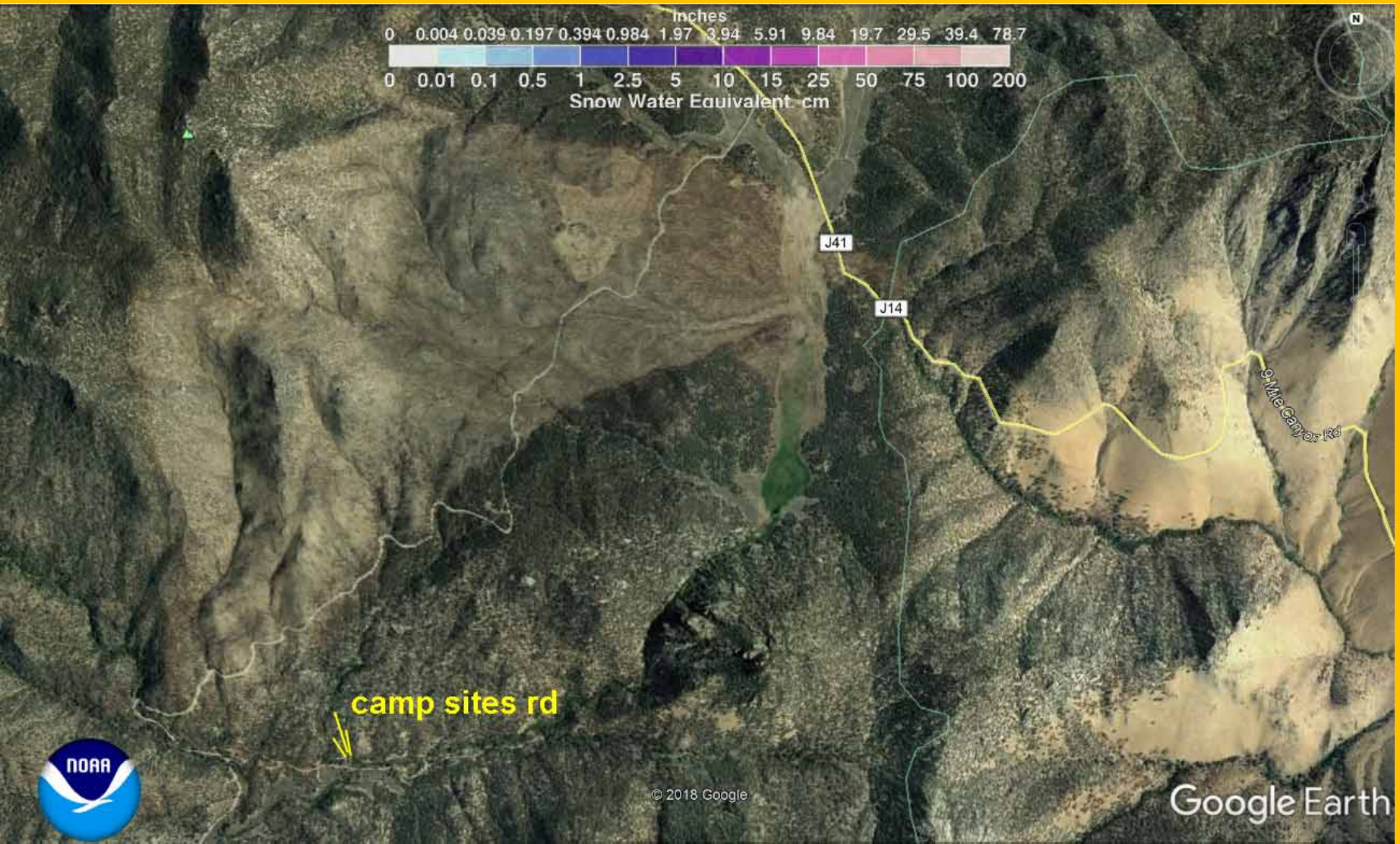




**Anne, one
of our
volunteer
helpers, in
2010,
measuring
some of
the
pictographs**



If you miss the campground turn, and keep going, you'll end up "T"-ing into Kennedy Meadows Rd



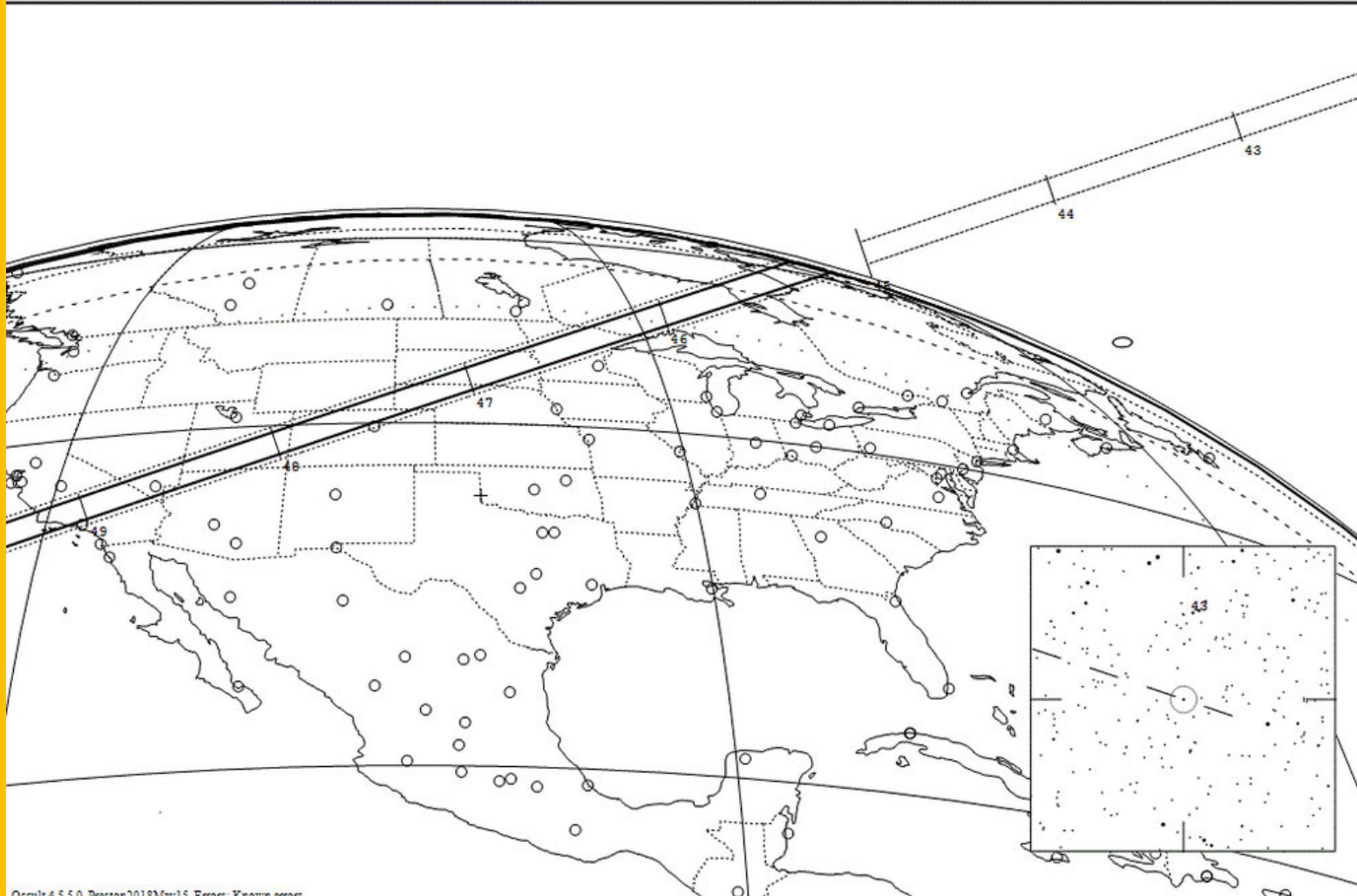
Site choice was determined by this rare and very favorable special event. A bright star (magnitude 9.3) will disappear behind the asteroid Christa along this path.

1015 Christa occults TYC 6304-01603-1 on 2018 Jul 14 from 6h 45m to 6h 54m UT

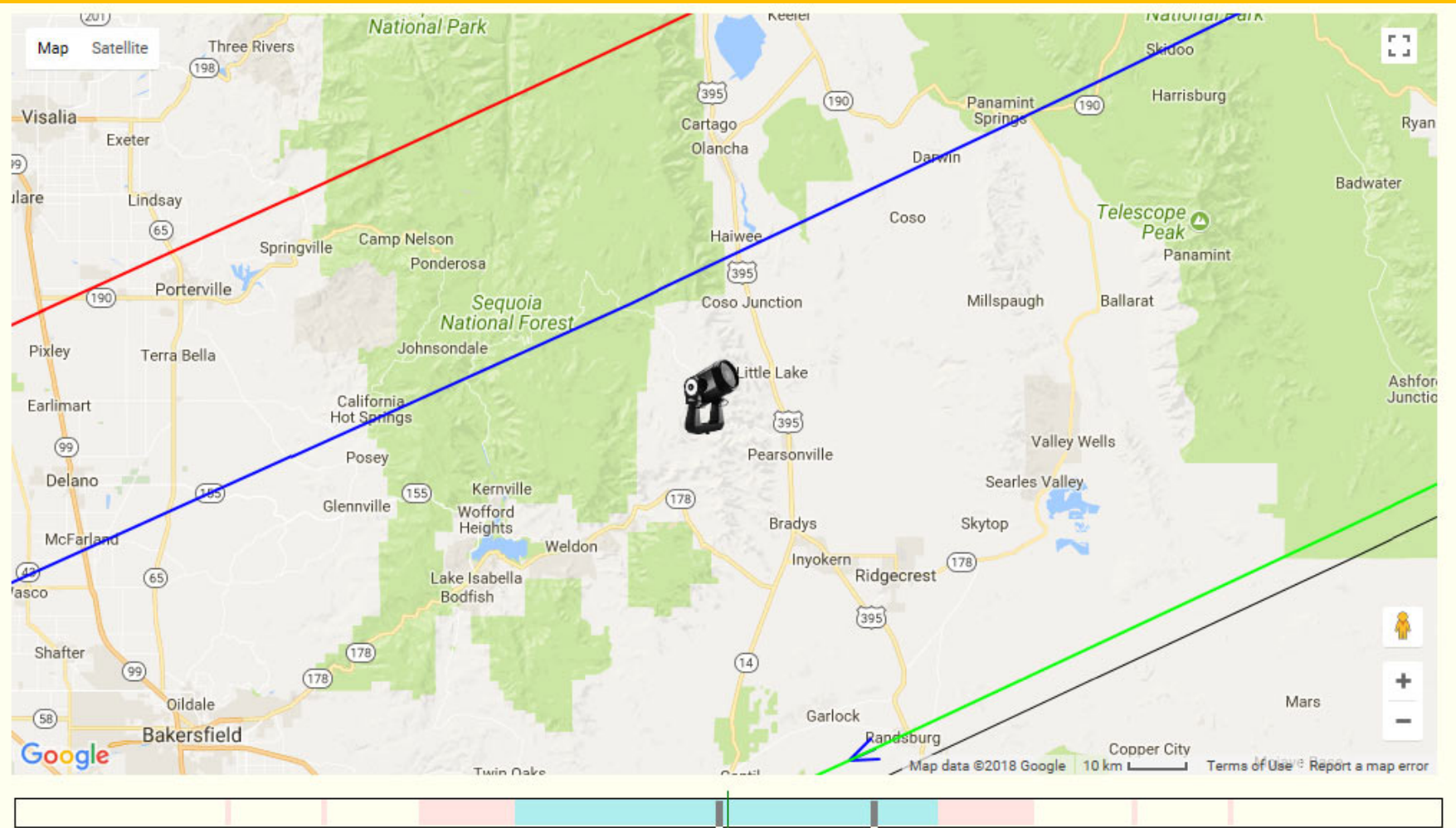
Star:
Mv = 9.3
RA = 19 17 46.7651 (J2000)
Dec = -19 37 37.574
[of Date: 19 18 53, -19 35 26]
Prediction of 2018 May 15.0

Max Duration = 7.0 secs
Mag Drop = 4.3 (0.0r)
Sun : Dist = 158 deg
Moon: Dist = 160 deg
: illum = 2 %
E 0.024"x 0.012" in PA 89

Asteroid:
Mag = 13.6
Dia = 97km, 0.058"
Parallax = 3.824"
Hourly dRA = -1.986s
dDec = -9.48"



The northern limit of the path is not far north of camp. The red line is bounds the 1-standard deviation uncertainty northern limit



Our Camp

Site resolution: 1.2427398989899 mi

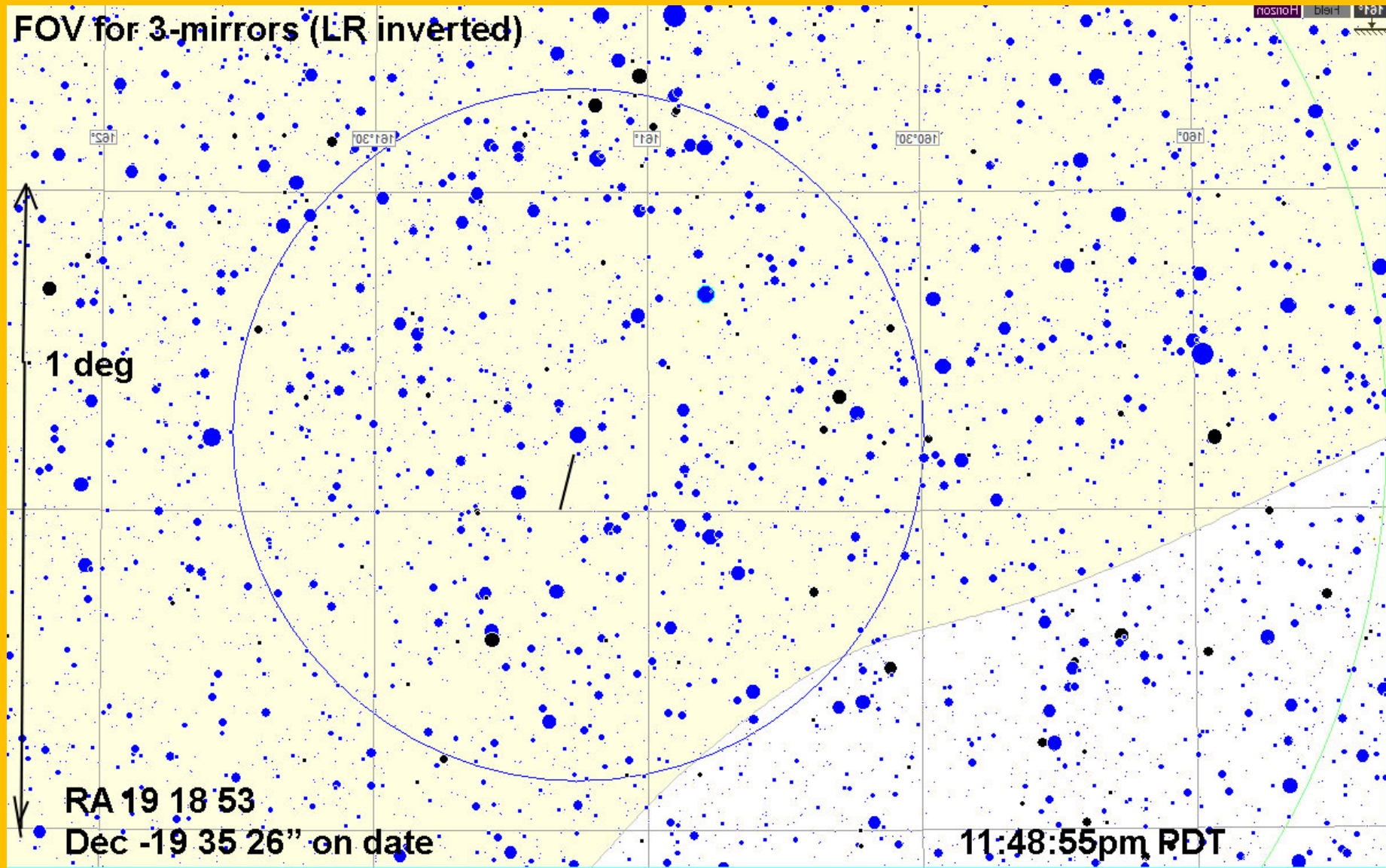
Observing locations currently announced by other observers:

1 = maybe; 2 = Richard Nolthenius (Nolthenius R Home)

Our Big Science equipment!

- 8" Celestron 8SE telescope
- Meade f/3.3 focal reducer to concentrate the focused light on...
- Watec 910hx low light video camera
- Signal to be combined with GPS time stamps using an IOTA Video Time Inserter, and the video frames then recorded on mini-DV tape with a Canon ZR45mc video recorder
- Here's what such an event looks like...

Target star, in rich star field of the Milky Way



Scope, videocam, and VTI plus recording gear in the gray box



Software (LiMovie) will do photometry on the miniDV file.avi

Light Measurement tool for Occultation bserveation using Video Recorder [Limovie 0.9.98.2a]

File Edit Option Tools Software Update

6818 0,95067,95068,05,42,58,9187,58,9354,...,1005.6
 6819 0,95069,95070,05,42,58,93521,58,9687,...,967.8;
 6820 0,95071,95072,05,42,58,9854,59,0021,...,1034.6
 6821 0,95073,95074,05,42,59,0188,59,0355,...,1042.4
 6822 0,95075,95076,05,42,59,0522,59,0688,...,1033.3
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 6837 0,95105,95106,05,42,59,5527,59,5693,...,1294.6
 6838 0,95107,95108,05,42,59,5860,59,6027,...,1249.6
 6839 0,95109,95110,05,42,59,6194,59,6361,...,1263.8
 6840 0,95111,95112,05,42,59,6528,59,6694,...,963.0;
 6841 0,95113,95114,05,42,59,6861,59,7028,...,946.8;
 6842 0,95115,95116,05,42,59,7195,59,7362,...,940.1;
 6843 0,95117,95118,05,42,59,7529,59,7695,...,895.9;
 6844 0,95119,95120,05,42,59,7862,59,8029,...,1024.9
 6845 0,95121,95122,05,42,59,8196,59,8363,...,1049.1
 6846 0,95123,95124,05,42,59,8529,59,8696,...,1068.5

Gamma Reverse Correction
 OFF Measure Field 1.00 More Fast

End Time of Field Exposure (Field1=Centre of Frame)
 h m s [Field1] [Field2] Threshold S1 S2
 05 42 59.8529 59.8696 80 IOTA

C:\dellweb\astocc\RawVid\2017-12-06 23:57:52.2

Current Frame 6846 Measurement 1Frame DEL START STOP DataRemove SaveToCSV-File Capture Open AVI Load CSV Copy CSV Exit

Measurement Value BKG/Frame 22.7
 Star Even 496.1
 Odd 571.7
 Frame 1068.5
 Color Value

Position Center Tracking X= 336 Y= 199
 Position Set Star Signal1 Signal2 TIV

Linked Tracking Link Passed-Frame1 Frame2 Rotate Point Set Clr Set Clr
 PSF Tracking Photometry

Form of BKG-Area Standard Avoid Sunlit Face Meteor/Lunar Limb
 Direction Setting Width 5 Gap 0

Number of Pixels / Radius Aperture Background Even 66 548 Odd 71 548 Frame 137 1096
 Set radius to memoried Radius Inner Outer 6 18 25

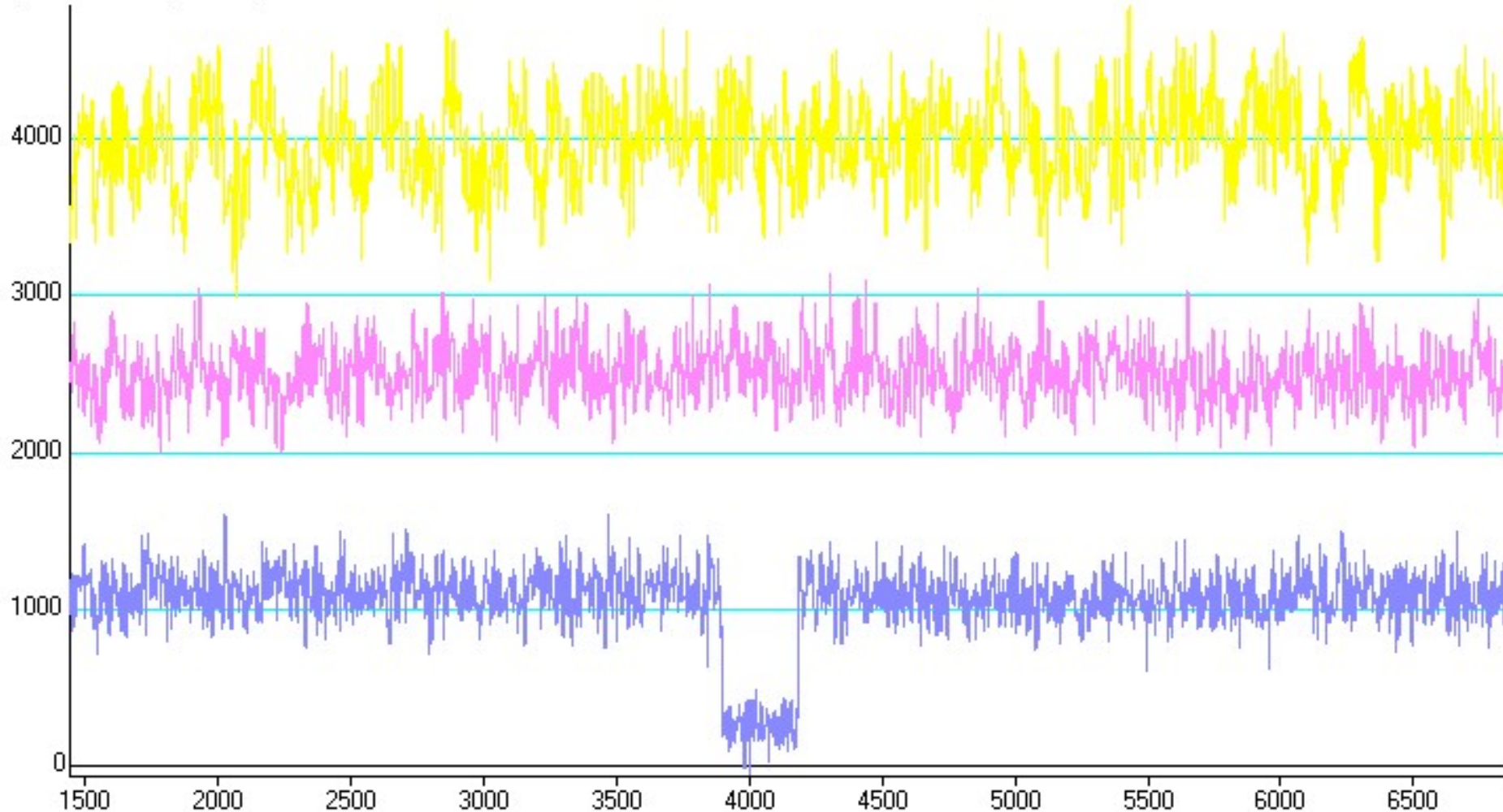
Star Image [3D] Update Setting Items
 Measurement / View Option Show Field Interval 1 Frame Rate 29.97
 Field Measure Graph

Field Order Even first Odd first
 Current Object A B C

P9 05:42:59 8696 8529 95124

2 minutes of video photometry; lightcurves! Tracking star (yellow), comparison star (pink), and target star at bottom (blue). Note the few seconds of the occultation

/ Aperture-Frame photometry /



Here's a Couple of YouTube videos of an asteroid occultation

- [Occultation by Chariklo](#), and its ring! Watch close to see the brief drop due to the ring.
- [Kolga Occultation](#) 2/5/2010; path, predictions, video, and resulting light curve

Combining Occultation timings from different observers across the path allows the precise outline of the asteroid to be measured more accurately than any other way, except by visiting spacecraft

- [May 14, 2018 Occultation by asteroid Virginia](#)
- If there is also long term photometry processed by computer models, then a combination of the shape and varying surface reflectivity can be determined. BUT – to separate these two different properties (shape, and how reflectivity changes across surface), then must have asteroid occultation data
- [May 1 2018 Occultation by Elektra](#)

Our Event involves a bright star – magnitude 9.3, by the asteroid Christa

- The event is at 11:49pm on Friday, as we're wrapping up other observing.
- From 10:45pm on, I and Kirk Bender and JP (our telescope team) will be showing you the whole process, from setting up, aligning the scope, identifying the target field, testing the equipment, and getting the data



Saturday: I'll get up early and start working on the French Crepes breakfast! Helpers can later carve fruit and set out the plates etc while I work my magic on the batter and stove.

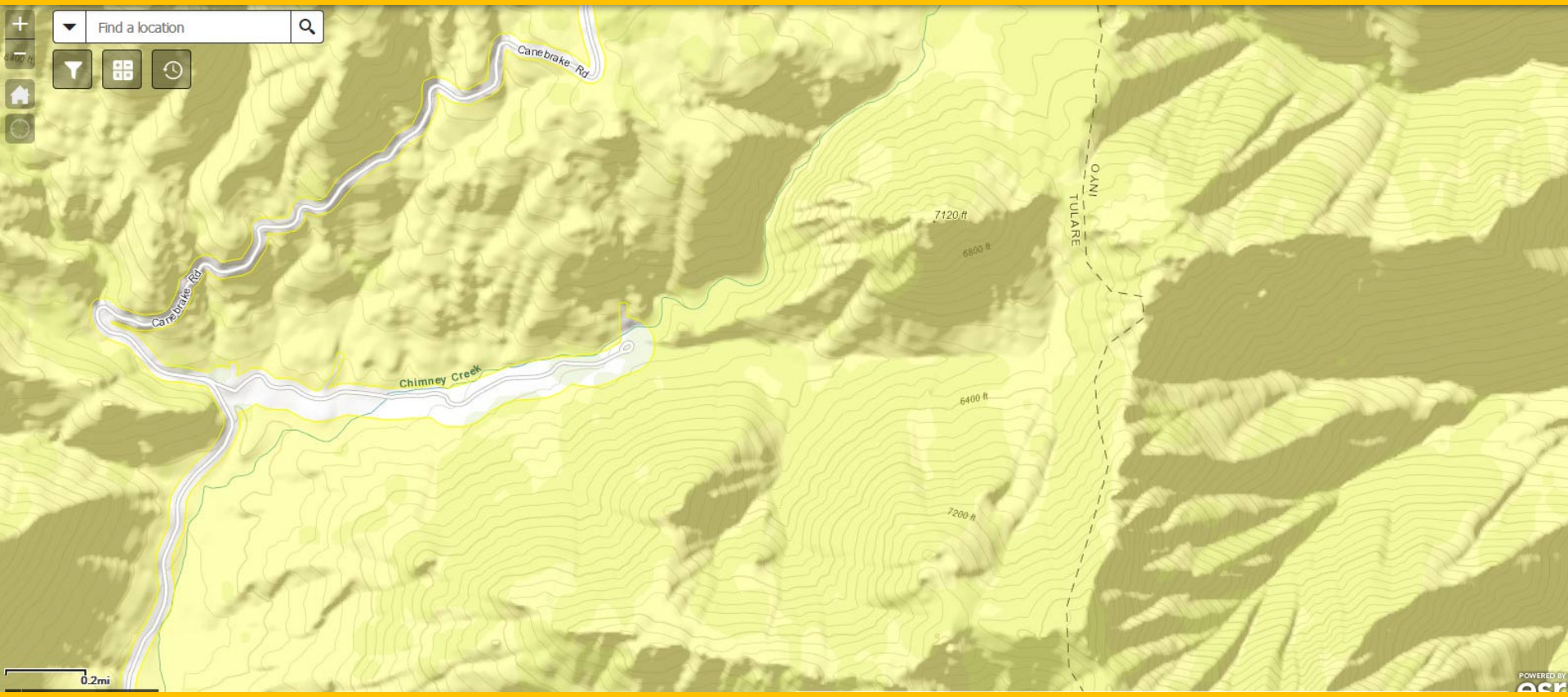
Saturday Adventures

- The Native American site will probably be our first goal
- Then finding good spots along the Kern River for lectures and frolic'ing in the river. South Creek falls? Slide rocks? I'm still working on these.
- I'd like to do a short hike to get to a look out over the desert, that will be closer to our camp. Will select a trail before I see you out there. There is fascinating geology and planetary processes here at the border between the Basin and Range and the Sierra.

Rugged landscapes of pinyon pine. The Pacific Crest Trail runs through here



Topo map of our camp area. There should be a trail that can take us 1200 ft up to the ridge from the campground, and get a panoramic view of the desert.





We'll have 2 or 3 telescopes to show you the deep sky wonders along the star formation regions of the center areas of our Galaxy. Mars, Jupiter, and Saturn are all well placed too

Sunday: Visit Remington Hot Springs on the Kern River below Lake Isabella





An intrepid group of volunteers constructed these pools right on the Kern River, from natural hot springs. Afterwards – I'll pass out the finals and we'll say our bon voyage. You should be back in Santa Cruz well before dark.

Your responsibilities:

- Read the “campers checklist” linked on our webpage and be sure you bring tent, and other camping gear
- Bring water for your drinking. There is not likely to be water at the campsite.
- Get yourself to/from the venues. The Cabrillo van will be jammed solid with cooking gear, telescopes, camp gear for instructor and volunteer(s)
- **Grading:** based mostly on the take-home final exam. Also includes your participation in all activities. I’ll be taking roll at each “micro-lecture”.
- You might consider taking a “NP” if you don’t care about your grade, since then you can sign up for another Astro 25 later, and have THAT one be for the grade!